DOCUMENT RESUME

ED 202 741 SO 013 322

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TITLE Wyoming Geology and Geography, Unit I.
INSTITUTION Laramie County School District 1, Cheyenne, Wyo.
SPONS AGENCY Wyoming State Dept. of Education, Cheyenne.
PUB DATE 79
NOTE 75p.; For related documents, see SO 013 323-328. Not available from EDRS in paper copy due to poor legibility of original document. Photographs, charts, and some pages may not reproduce clearly from EDRS in microfiche.

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Elementary Education; *Geography Instruction; *Geology; Learning Activities; *Locational Skills (Social Studies); *Map Skills; Social Studies; Units of Study
IDENTIFIERS *Wyoming

ABSTRACT

This unit on the geology and geography of Wyoming for elementary school students provides activities for map and globe skills. Goals include reading and interpreting maps and globes, interpreting map symbols, comparing maps and drawing inferences, and understanding time and chronology. Outlines and charts are provided for Wyoming geology and geography. A geological time chart and outlines of Wyoming mineral deposits, soil types, flora, fauna, climate, and early man are included. For specific activities, students compare political, historical, road, weather, and relief maps of the same area; collect weather maps; make relief maps; play games to learn directions; make a map of an imaginary trip; and determine purposes of Wyoming mineral exports. Students also discuss advantages and disadvantages of dam building; locate Wyoming mountains, rivers, lakes, and reservoirs; and study rock collecting. Reproducible materials are a pre- and posttest, worksheets on following directions, a compass exercise, and activities for finding large communities on maps. A bibliography and reproducible maps are also provided. (KC)

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UNIT I

WYOMING GEOLOGY AND GEOGRAPHY

BY: TERRY ROBINSON

Wyoming Studies Development Model,

A Title IV C, Fy '79 Project, Directed

By Malcolm Cook, Social Studies Consultant

Draft III

SO 013 322

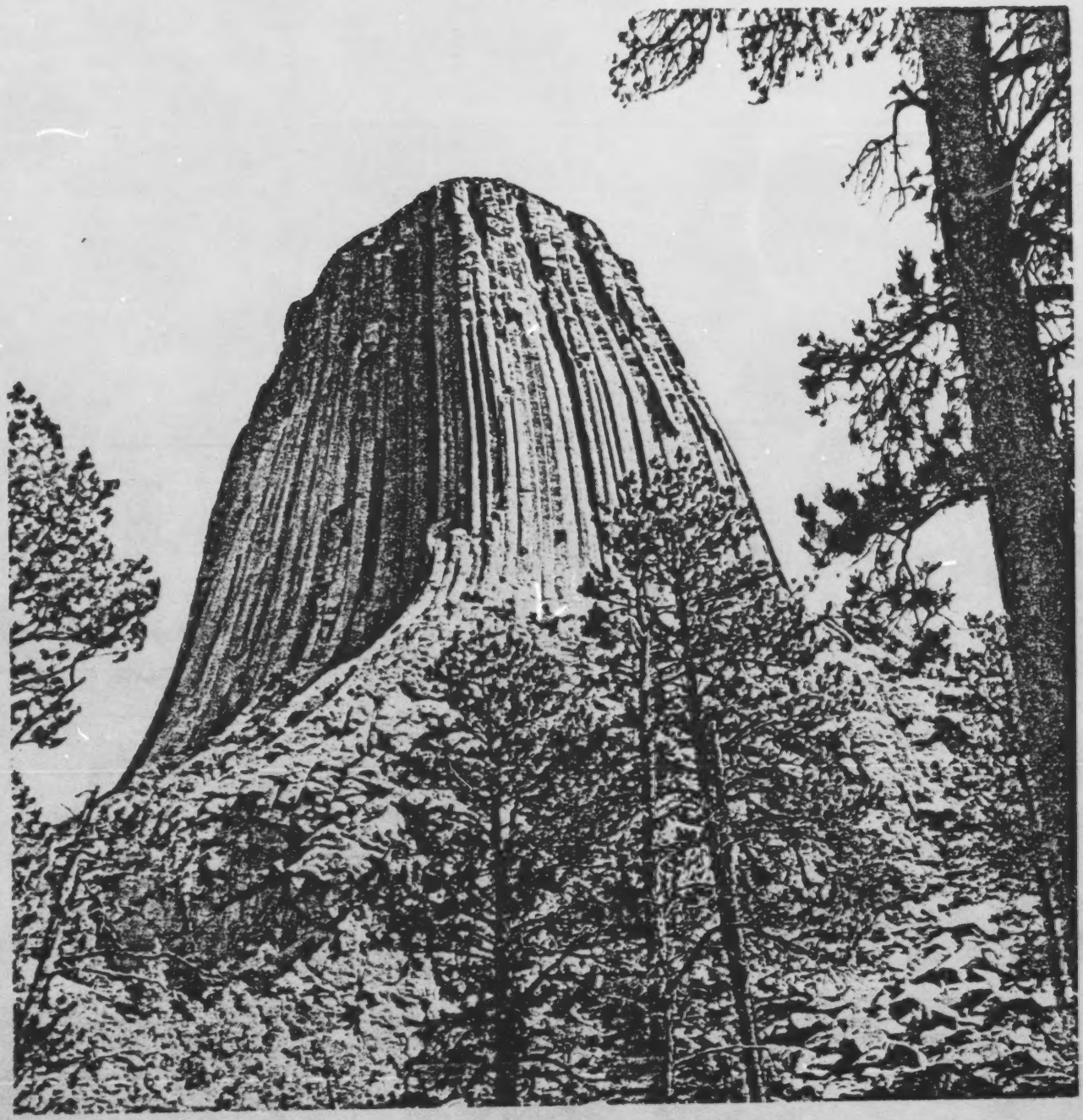
Dr. Byron Barry, Superintendent of Schools

Laramie County School District Number One

Cheyenne, Wyoming

Unit 1

Wyoming Geology and Geography



The State of Wyoming

Department of Education | Hathaway Building | Cheyenne Wyoming 82002

Lynn Simons
Superintendent of Public Instruction

WYOMING STUDIES DEVELOPMENT MODEL
(WySDM)

1979-81

A Federal Title IVc Project developed by Laramie County School District Number One, Cheyenne, Wyoming in cooperation with the Wyoming State Department of Education, Lynn Simons, State Superintendent of Public Instruction.

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INTRODUCTION TO UNIT I

Each unit, though an essential part of the whole, has been developed independent of the other eleven. This unit, Wyoming Geography and Geology, was the first to be developed. The guide has suggestions on how to present material on the subject. Ideas were accepted from several local teachers as well as teachers from around Wyoming. No lesson plans have been written for this material. Thus each classroom teacher is free to use his/her own expertise in adapting the material to their own classroom needs.

Materials from Dr. Harold Brown's, The Wyoming Occupance Atlas, were adapted for this project.

No listing of goals or student outcomes is ever complete. You, the teacher, are encouraged to add or delete as you see fit. Social studies skills are included in the course of completing the various activities.

Use these materials and have a good time learning to appreciate our state.

Malcolm Cook, Director

Terry Robinson, Facilitator

CONTENTS

WYOMING GEOLOGY AND GEOGRAPHY

INTRODUCTION

General Map Skills.....Pink

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GENERAL MAP SKILLS

CONCEPTS FOR MAP AND GLOBE STUDY

The concepts and skills for map and globe study are interdependent, and have been separated only to enhance readability.

1. The earth can be divided into various hemispheres. (North, South, East, West)
2. On maps and globes north-south lines are called meridians of longitude, and east-west lines are called latitude.
3. Parallels and meridians on globes and maps are useful in locating points. (grid concept)
    A. A meridian is defined as a great circle on the surface of the earth, passing through the poles and any given place, marking the longitude. Longitude being the distance east or west of the prime meridian.
    B. A parallel is defined as one of the imaginary circles on the surface of the earth parallel to the equator, marking the latitude. Latitude being the distance north or south of the equator.
4. North Pole, South Pole, Equator, Arctic Circle, Antarctic Circle, Tropic of Cancer, and Tropic of Capricorn should be understood as points of reference to help in locating various points on a map.
5. Use of mileage, metric and ratio scales and legends of various maps make comparisons possible.
6. Portraying the earth's surface on a flat map involves distortion of land and water areas.

8

7. Only half the earth can be seen at one time in its true form regardless of how far out in space man goes.
8. The concept of chronology should serve to help the student sequence the changes that have occurred in the boundaries of the area of Wyoming in the passage of time.
9. Seasonal conditions are associated with distances from the equator and altitude.
10. The skills necessary to use the resource materials to further the student's understanding of Wyoming as a physical and political entity, such as map reading and research skills, are essential.
11. Optimal opportunities to develop and enforce basic study skills to higher levels (reading, listening, spelling, writing, discussing, measuring, and computing) are valuable.
12. The student should be able to use directions on a map, including intermediate directions (N.E.,N.W.,S.E.,S.W.).
13. Recognition of the mechanical differences of standardized county, state and national boundaries is a skill to be learned.

    ----------county boundaries

    ___ _ ____ _ ___state boundaries

    ____ _ _ ____ _ _national boundaries

14. Identification of the continents can be made based on size, shape, and location.
15. Learn how to locate the hemisphere, continent, country, state and city in which pupils' live. (Be aware of Wyoming's location in relationship to the location of the rest of the nation and the world.)

16. By reading maps locate the principal natural and man-made features of pupils' community and state.

17. Locate the major oceans and the continents bordering them.

18. Identify areas of low, middle, and high elevation on various kinds of maps. (some maps do not show elevation.)

19. Learn the various symbols used on a map and the meaning of the colors used.

(Colors are used to show levels of elevation. Check any good map for a list of symbols used. These can be found on the map's legend.)

A listing of geography goals for the primary level has been included. These goals, developed by local school district personnel, begin on the next page.

Division of Instruction
Laramie County School District Number One
Administration Building
Cheyenne, Wyoming

GEOGRAPHY GOALS

Primary Level

A. The student will be able to understand how to read and interpret maps and globes.

1. The student will learn that a globe is a round, man-made object that is a model of the earth.

2. The student will be able, when given a list, to choose which tools are useful to learn about the geography of the earth.

3. The student will learn that on the globe the color blue represents water and that other colors, such as yellow, brown, green, etc., represent land and elevation.

4. The student will learn that the colors, lines and symbols are man-made representations to help students identify or locate natural and man-made places on the surface of the earth.

5. The student will be able to locate the approximate area where he lives on a globe and a map.

6. Given a globe and a map, the student will be able to locate continents and oceans.

7. The student will learn to interpret maps and globes and be able to:

   a. Orient the map and note directions.
   b. Use cardinal directions in classroom and neighborhood.
   c. Use intermediate directions as southeast, northeast.
   d. Use cardinal directions and intermediate directions in working with maps.
   e. Use relative terms of location and direction as near, far, above, below, up, down.
   f. Understand that north is toward the North Pole and south toward the South Pole on any map projection.
   g. Understand the use of the compass for direction.
   h. Use the north arrow on map.
   i. Orient desk outline, textbook and atlas maps correctly to the north.
   j. Use a grid system to locate points using classroom, school and community.
   k. Use parallels and meridians in determining direction (longitude and latitude).

l. Use different map projections to learn how the pattern of meridians and that of parallels differ.
m. Construct simple maps which are properly oriented as to direction.
n. Demonstrate that a map is a flat representation of the curved surface of the earth (globe).
o. Orient maps and correctly identify directions.

B. The student will be able to understand how to read and interpret map and globe symbols and compute distance.

1. The student will learn to use spatial relationships in the classroom.

2. The student will learn comparative size of one land area (state) and its relationship to larger land area.

3. The student will be able to use the horizon ring mounting to measure the distance between two given places on a globe.

4. Locate places on maps and globes.

a. Recognize land and water masses on a globe and on a variety of maps--physical, political, chalkboard, weather maps, etc.
b. Identify on a map of the world the equator, tropics, circles, continents, oceans, large islands.
c. Use a highway map locating places by number and key system; plan a trip using distance, direction and locations.
d. Relate low latitudes to the equator and high latitudes to the polar areas.
e. Interpret abbreviations commonly found on maps.
f. Use map vocabulary and key accurately.
g. Use longitude and latitude in locating places on wall maps.
h. Use an atlas to locate places.
i. Identify the time zones of the United States and relate them to longitude.
j. Understand the reason for the International Date Line and compute time problems of international travel.
k. Consult two or more maps to gather information about the same area.
l. Recognize location of major cities of the world with respect to their physical setting.
m. Associate map symbols with real things.
n. Construct a map using own key or legend.
o. Read map and globe symbols.
p. Apply directions to classroom, school and neighborhood.
q. Trace routes of travel by different means of transportation.
r. Read maps of various types which show elevation.
s. Identify and state the advantages of physical and political maps.

C. Use scale and compute distances

1. Use small objects to represent large ones, as a photograph compared to actual size.
2. Make simple large-scale maps of a familiar areas, such as classroom, neighborhood.
3. Compare actual length of a block or a mile with the size shown on a large-scale map.
4. Determine distance on a map by using a scale of miles.
5. Compare maps of different sizes of the same area.
6. Compare maps of different areas to note that a smaller scale must be used to map larger areas.
7. Compute distance between two points on maps of different scale.
8. Estimate distances on a globe using latitude. Estimate air distances by using a tape or a string to measure great circle routes.
9. Understand and use map scale expressed as representative fraction, statement of scale or bar scale.
10. Develop the habit of checking the scale on all maps used.
11. Identify secondary locations in relationship to a primary point.

D. Interpret map symbols and visualize what they represent.

1. Understand that real objects can be represented by pictures or symbols on a map.
2. Learn to use legends on different kinds of maps.
3. Identify the symbols used for water features to learn the source, mouth, direction of flow, depths and ocean currents.
4. Study color contour and visual relief maps and visualize the nature of the areas shown including sea level and elevations.
5. Interpret the elevation of the land from the flow of rivers.
6. Interpret dots, lines, colors and other symbols used in addition to pictorial symbols.

E. Compare maps and draw inferences.

1. Read into a map the relationships suggested by the data shown as the factors in the location of cities.

2. Compare two maps of the same area. Combine the data shown on them and draw conclusions based on the data.

3. Recognize that there are many kinds of maps for many uses and learn to choose the best map for the purpose at hand.

4. Understand the differences in different map projections and recognize the distortions involved in any representation of the earth other than the globe.

5. Use maps and the globe to explain the geographic setting of historical and current events.

6. Read a variety of special purpose maps and draw inferences on the basis of data drawn from them and from other sources.

7. Infer man's activities or way of living from physical detail and from latitude.

F. Understanding time and chronology.

1. Learn to tell time by the clock.

2. Use names of the days of the week in order.

3. Use names of months in sequence.

4. Use calendar to find dates of special events and to determine lenth of time between important dates.

5. Associate seasons with particular months in both northern and southern hemispheres.

6. Understand the relation between rotations of the earth and day and night.

WYOMING CONCEPTS

FOR THE

STUDENT

WYOMING GEOLOGY AND GEOGRAPHY

1. Where is Wyoming?

   Great Plains

   Rocky Mountains

   Wyoming Basin

2. Geologic History

   Precambian — Meozoic

   Paleozoic — Cenozoic

3. Landscape Styles -- Wyoming (evolution of landscape)

   causes -- erosion

   how rocks are formed -- deposition
   igneous activity

   how rocks are deformed - folds, faults, erosion, gravity

4. Some Geography

   Rivers -- one map

   Plains
   Mountains } one map
   Basins

5. How man uses the land

   Mineral deposits
   - older rock
   - basins - sedimentary rocks
   - fluids
   - special minerals

   Soil types

   Flora

   Fauna

   Climate

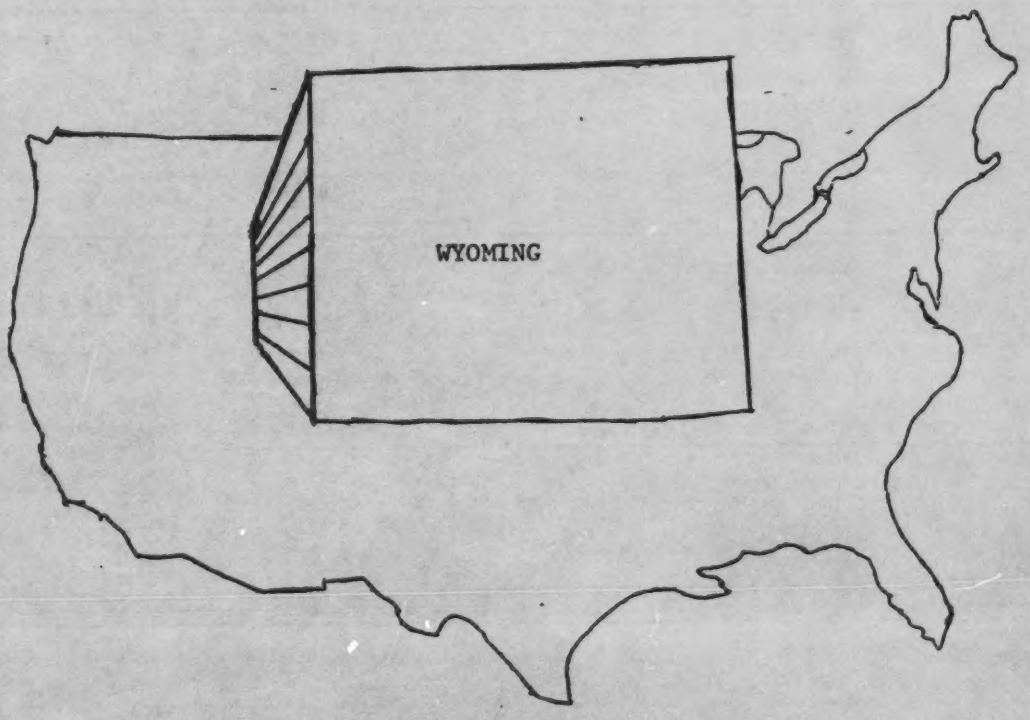
   Early Man

SECTION I

WHERE IS WYOMING?

At the end of this lesson the student will be able to:

1. locate Wyoming on a U.S. map of the states or regions and identify it by correctly labeling the state.
2. label, on an area map, the six states that border Wyoming.
3. list the 3 mountain groups that are located in Wyoming. (Northern, Middle, Southern Rockies)
4. show how the Great Plains extend into Wyoming.
5. locate the Wyoming Basin and the 3 major mountain groups on a map of Wyoming by coloring in the appropriate areas in different colors.
6. give some indication of why boundaries are where they are.



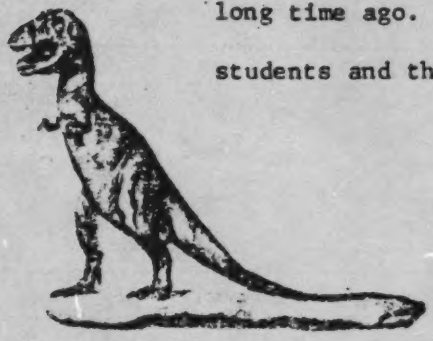
SECTION II

GEOLOGIC HISTORY *

At the close of this unit the student will:

1. know there are four units of time called eras.
2. know the names of these 4 eras:
   1. Precambian
   2. Paleozoic
   3. Mesozoic
   4. Cenozoic

   (See Geologic time chart and time scale)
3. know that geologic eras cover extensive time periods.
4. know we are living in the Cenozoic era.
5. know that the eras are divided into shorter units of time called periods and epochs.
6. know that many kinds of dinosaurs roamed our area a long time ago. This is a popular theme for fourth grade students and the teacher may want to expand on this.



* These are commonly accepted geologic hypotheses.

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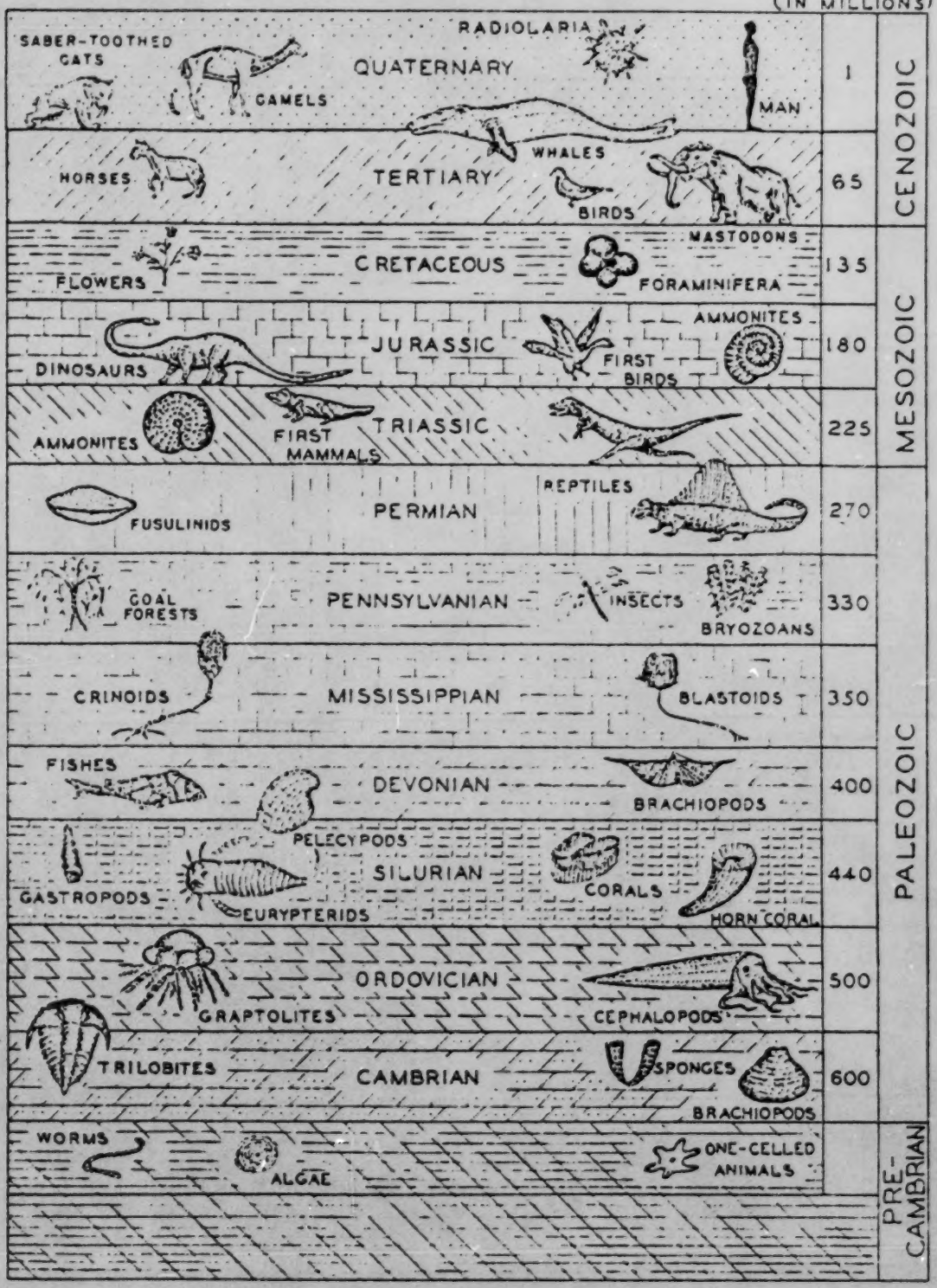
GEOLOGIC TIME CHART



GEOLOGIC TIME CHART OF WYOMING

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Time	Era	Period	Epoch	Events In Wyoming	Characteristic Life
0	CENOZOIC	Quaternary	Holocene	Present Climate	Modern Life
3			Pleistocene	Ice Age Glaciers	
12		TERTIARY	Pliocene	Tetons Formed Terrestrial Deposition	
26			Miocene	Intense Volcanic Activity In Yellowstone Area. Temperate Climate.	
38			Oligocene	Terrestrial Deposition Of Great Amounts of Volcanic Ash. Warm Temperate Climate.	
58	65 M. Y.		Eocene	Green River Lake and Terrestrial Deposition. Subtropical Climate.	
65			Paleocene	Terrestrial Deposits Tropical Climate	
135	MESOZOIC	Cretaceous	Transgression and Regression of Seas Rocky Mountains Begin to Rise. Abundant Cephalopods.		
180		Jurassic	Seas Withdrew, Broad Flood Plains. Many Dinosaurs.		
225	160 M.Y.	Triassic	Fluctuation Of Shore Line. Wide Tidal Flats, Mild Climate.		
270	PALEOZOIC	Permian	Shallow Seas in Western Wyoming Invertebrates Common.		
		Pennsylvanian	Local Uplift in Southcentral and Southern Part of State.		
350		Mississippian	Entire State Submerged in Warm Tropical Seas.		
400		Devonian	Seas in Northwestern and Western Wyoming.		
440		Silurian	Probably Emergent, Record Incomplete In Wyoming.		
	375 M.Y.	Ordovician	State Inundated by Shallow Warm Waters.		
500		Cambrian	Seas Transgressed From West Across Entire State.		
600	PRECAMBRIAN		Long Interval of Erosion at Close of Era.		No Record Of Animal Life In Wyoming
			Land Reduced to Broad Plains of Low Relief.		
1000			Mountain Building.		
			Algae Browing in Ancient Seas.		
	4 Billion Years Long		Widespread Seas.		
2000			Continents in Existence.		First Record of Life
4500	Formative Era		Formation of the Earth		No Life

M.Y. - Millions of years before the present

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TABLE 19-1 CALIBRATED GEOLOGIC TIME SCALE

ERA	PERIOD	EPOCH	EVENTS IN THE HISTORY OF LIFE	OTHER IMPORTANT EVENTS
CENOZOIC	Quaternary	Recent (10,000)	Earliest man; Modern horse evolves in North America, then dies out	Ice Ages; Grand Canyon carved; Pacific Coast Ranges formed
		Pleistocene (1,000,000 to 2,000,000)		
	Tertiary	Pliocene (11,000,000)		
		Miocene (25,000,000)	Rapid spread and evolution of grazing mammals	
		Oligocene (40,000,000)	Earliest elephants	
		Eocene (60,000,000)	First primitive horses, rhinoceroses, and camels	
		Paleocene (70,000,000)	First primates	Uplift and folding of Western Geosyncline
MESOZOIC	Cretaceous (135,000,000)		Extinction of dinosaurs; Great evolution and spread of flowering plants	Half of North America covered by seas; Uplift of Sierra Nevada
	Jurassic (180,000,000)		First birds and mammals; Dinosaurs at their peak (Dinosaurs)	
	Triassic (225,000,000)			Arid climates in much of western North America
PALEOZOIC	Permian (270,000,000)		Mammal-like reptiles	Ice Ages in Southern Hemisphere; World climate much like today; Deserts in western United States
	Pennsylvanian (305,000,000)		First reptiles (Large insects)	Widespread swamps, coal source; Tropical climate in United States; Uplift and folding of Appalachian Geosyncline
	Mississippian (350,000,000)		(Sharks abundant)	Widespread flooding of North America, limestone deposited
	Devonian (400,000,000)		First amphibians; First forests (Trilobites)	Filling of Appalachian Geosyncline and Western Geosyncline
	Silurian (440,000,000)		First air-breathing animals (scorpions) First land plants	Deserts in eastern and central U.S.
	Ordovician (500,000,000)		Trilobites at peak; First vertebrates (fish)	Widespread flooding of North America by seas
	Cambrian (600,000,000)		Marine shelled invertebrates common; First abundant animal fossils	
PRECAMBRIAN PROTEROZOIC	(2,500,000,000)		Marine invertebrates probably common; few with shells, (1,200,000,000)	Glaciation-probably worldwide; Many geosynclines filled, uplifted, and eroded
PRECAMBRIAN ARCHEOZOIC	(4,500,000,000)		Earliest plants (marine algae) (3,200,000,000)	

NUMBERS REFER TO TIME IN YEARS B.P. (BEFORE PRESENT) SINCE THE BEGINNING OF THE ERA, PERIOD, OR EPOCH

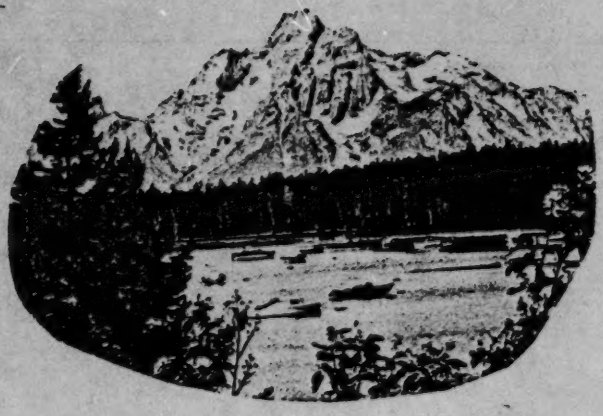
SECTION III

LANDSCAPE EVOLUTION IN WYOMING

TOPOGRAPHY

At the end of this unit the student will be able to:

1. describe how rocks are formed using the concepts of deposition, igneous activity, and metamorphia activity.
2. describe the processes of mountain formation (rock deformation) using the concepts of folds, faults, and erosion.
3. describe the role of gravity in rock deformation.
4. describe how erosion (wind and water) helps in the deformation of rocks.



SECTION IV

WYOMING GEOGRAPHY

At the end of this unit the students will be able to:

1. describe the concept of continental divide telling what it is, what it does, and where it is located in Wyoming.
2. locate on a Wyoming map and correctly label the major mountain ranges in the state, particularly those near their home.
3. locate and label the major river systems in Wyoming. (Big Horn-Wind, Green, Platte, Powder, Snake, Yellowstone)
4. describe how the Bear River Drainage differs from all other river systems in Wyoming. (only river system not draining into one of the oceans.)
5. describe the difference between plains and basins.
6. locate the major basins on a Wyoming map. (Powder River Basin, Big Horn Basin, Wind River Basin, Green River Basin)
7. describe how topography, mountains, rivers, etc., helps decermine where people live in any given area.

SECTION V

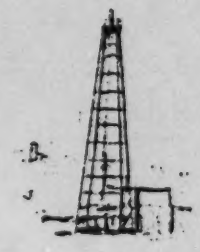
HOW MAN USES THE LAND

At the end of this unit the student will:

A. Mineral Deposits

1. Know Wyoming has diverse mineral deposits particularly energy related minerals.
2. Be aware that mineral resources are limited, and once they are used they are not replaced in our time.
3. Be able to tell how minerals are made, especially coal and oil.
4. Locate the major mineral deposits in Wyoming by marking a map with symbols of the minerals. Maps in World Book Encyclopedia are good sources for this.
5. Be able to explain water's role in the development of Wyoming's mineral wealth.
6. List and give the rank of national production of Wyoming's 5 major exported minerals. (See World Almanac)

petroleum	natural gas
sodium compounds	uranium
coal	



B. Soil Types

1. Know that Wyoming has several different soil types.
2. Know that Wyoming has quite fertile soil.
3. Be aware that the lack of water has a marked effect on Wyoming's soil productivity.

Wyoming state flower

C. Flora

1. Have some idea of the native flora of Wyoming. Some plants, native to Wyoming, are edible, while others must be avoided because they are poisonous to man and/or animals. Each Cheyenne School should have a copy of Bob Larson's, Guide to Edible Plants in Wyoming in its library.

D. Fauna

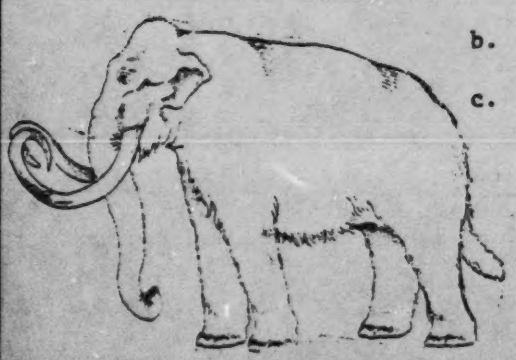
1. Early man depended on Wyoming's diverse native fauna for food. The utilization of the bison is a good example of this. Our native animals are still important and bring people here as tourists and hunters. Wyoming is now home to many animals such as the cow and pheasant which were introduced to Wyoming by man.

E. Climate

1. Mans' use of the land has been, to a large degree, determined by the weather.

F. Early Man

1. People who study ancient remains of man and his artifacts are called archaeologists.
2. People have been in the area called Wyoming for quite sometime. Some archaeological sites are:
   a. Mammoth Kill - South of Rawlins - 11,000 years ago.
   b. Jimmy Allen site near Laramie - 7,900 years ago.
   c. Horner site near Cody - 6,800 years ago.



MAP ACTIVITIES

MAP AND GLOBE

Activities

1. Construct a model of your school and surrounding area. Make a map showing how to get to school from your home. In your model neighbor area the buildings may be made of milk cartons or small boxes. Using poster paint, paint the lawns, streets, and playgrounds on large white paper.

2. Construct a make believe city and make a picture map of it using symbols you have already learned.

3. Obtain road maps for each pupil and analyze them together:

    a. Find 5 communities that are shown differently.
    b. How are they different?
        1. size
        2. shape
        3. distance from your community
        4. time belt
        5. direction from your community

    (See Activity IV at end of Section)

    Road maps may be obtained from the Wyoming Highway Department. Write:

    Wyoming Highway Department
    P.O. Box 1708
    Cheyenne, Wyoming 82001

4. Collect as many different types of maps of the same area as possible. Some types of maps may be political, historical, resource, road, weather, and relief maps. Compare the similarities and differences.

5. Collect U.S. and local weather maps from newspapers and U.S. Weather Office.

6. Find aerial pictures of your local area and see how they compare to maps of the same area. Aerial photographs may be obtained from the Wyoming Highway Department (address as above.) Phone 777-7541. They cost $4 to $5 each. Put on the envelope, Attention:Photogrammetry and Surveys Department.

7. Glue yarn on paper to make an outline map.

8. Paste maps to heavy cardboard. Cut out to make jigsaw puzzles.
9. Trace a map on burlap and then stitch around it. By using stitchery add some of the items of interest.
10. Cut continents from different sheets of colored paper. Practice putting them on a blank map of the world. Identify them.
11. Make a globe by making a ball of chicken wire. Stuff it with blue kleenex. Cut out felt or cloth continents and place on the globe in their relative positions.
12. Make a globe using a balloon covered with paper strips dipped into a diluted Elmer's Glue mix and paste to the balloon.
13. Make a relief map of the state using salt and cornstarch. The recipe for this is:

> Mix one cup of table salt, one-half cup of cornstarch, and three-fourths of a cup of cold water. Heat the mixture in a double boiler for 2 or 3 minutes, or until the clay follows the spoon in the stirring process. Pour onto wax paper or foil to cool. When cool, knead the mixture with the hands and it is ready to use. The clay will become very hard.

14. Compare old maps with present day ones.
15. Make paper or clothes pin dolls to place on a map showing different kinds of clothing worn.
16. Make a world map from heavy paper that can be placed on a flat surface. Use tooth picks, sugar cubes or other materials to show different kinds of homes throughout the world.
17. Collect labels from canned goods from other countries. Use a world map to locate these places. Penpals in other countries would be a good way to acquire these labels.
18. Use a map of your area and symbols to show places where families get food. This could include markets, stores, and farms.

19. Illustrate why travelers use maps instead of globes. The pupil can lay out a route of travel by highway using a map. Try the same with a globe.

20. Using the opaque projector or overhead projector, enlarge an outline map for your bulletin board or chalk board.
    a. Have pupils develop legend and scale.
    b. Make symbols and locate them on the map.

21. Give each child a circle and have him fold it in fourths. Cut out ¼ of the circle to show the area of earth that is land.

22. Place signs stating North, South, East, and West on the proper walls of the classroom. Do this, also, to teach the middle directions---- Northeast, Southeast, Northwest, and Southwest.

23. Play a game to learn directions. "If I went from Evanston to Casper, what direction would I go?" "If I went from Chugwater to Jackson, what direction would I go?" You might want to use a version of Simon Says.

24. Have a puppet show explaining basic concepts "What have you learned about maps and globes?" Puppets can be made from half peanut shells and put on the finger, or fingers can be painted. Hand puppets made from scrap material are also fun to make.

25. Distribute names of countries, states, rivers, or cities. Use maps to tell which names refer to countries, rivers, states, or cities.

26. Play a game of "Twenty Questions." They must identify a place in Wyoming. Questions must be asked that can be answered with yes or no.

27. For creative writing, take an imaginary trip to some area in the state and write what you have learned. Write in diary form and tell of daily events as you travel. Include a route map of your trip.

28. Make a flannel map of Wyoming for the flannel graph. Cut our various names of rivers, parks, cities, and special features to be placed in their proper places.

29. From modeling clay, make a mold of Wyoming the size of a paper-weight. Fill it with plaster of paris and paint it. Scribe map of Wyoming on the bottom.

30. Make a cardboard measuring stick to fit the scale of the map in your room. Practice finding the distance to different cities and other points of interest. Make a mileage wheel to determine miles between points.

31. Using a roadmap find the best routes from your home to different places of interest in Wyoming. In addition to the numbers of the highways you would take, figure the total mileage.

32. Make up different scales for maps. For example have one inch equal 100 miles, one inch equal 500 miles, and one inch equal 1000 miles. Then write several problems such as A town is 700 miles from B. Draw a line showing the distance between the two towns.

33. Invite Bob Larson, the science coordinator for the district, to give his presentation on "Wyoming Fossils" to your classes.

34. Have the students make models and charts of dinosaurs that were in what we now call Wyoming.

35. Have students write to the Wyoming Mining Association, West Lincolnway, Cheyenne, Wyoming 82001, for information on different minerals in Wyoming and their uses.

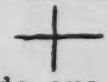
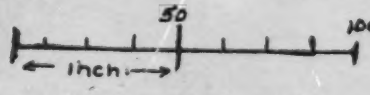
36. Make a display of all the uses to which coal is put. (or anyother mineral)

37. Ask students to locate Wyoming's minerals in their home, clothes, food, and school.

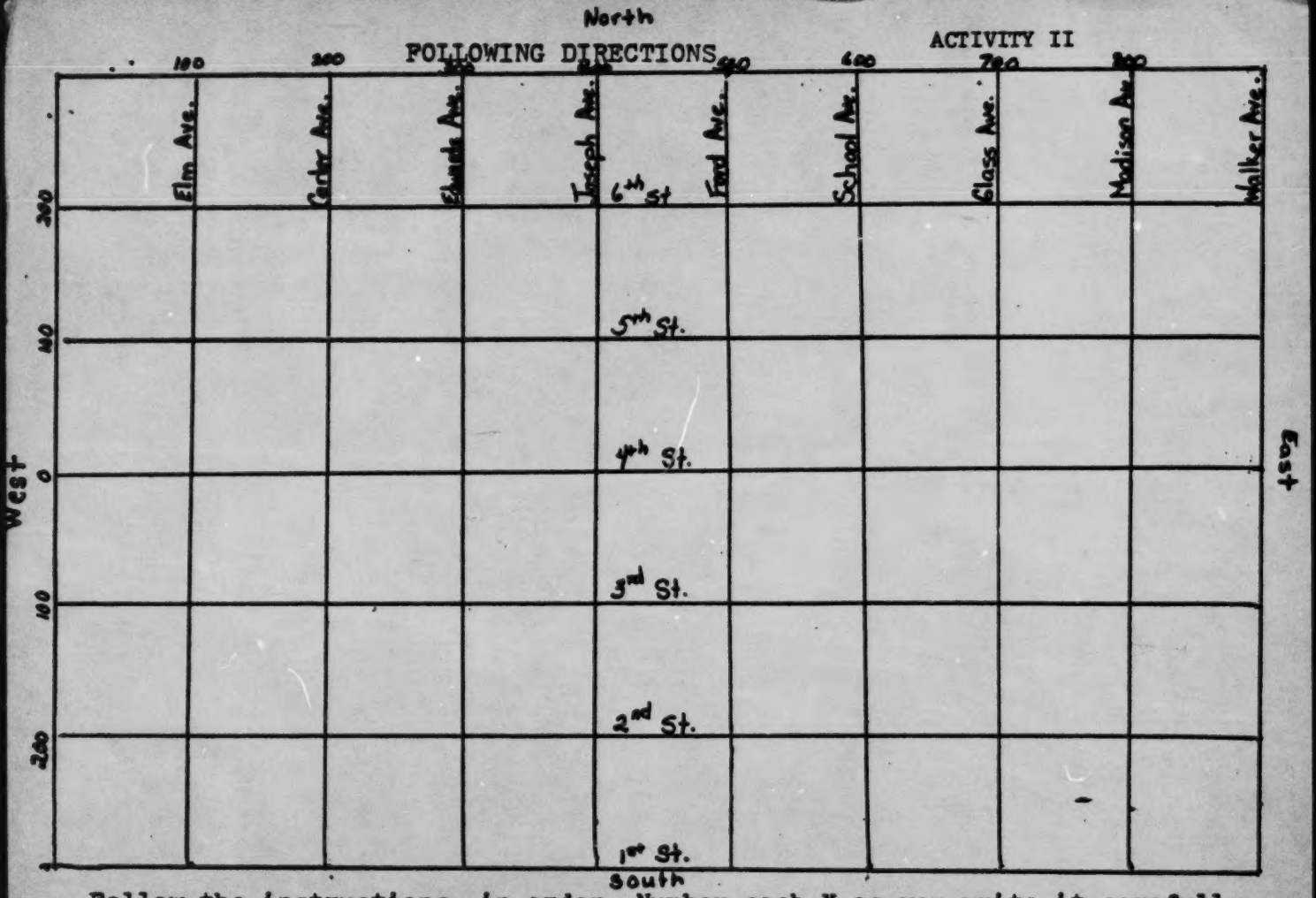
38. Have students do research and make a display answering the question, "Why is Wyoming called America's Storehouse?".

39. Have students find out to whom and for what purpose Wyoming exports its minerals.

PRE-, POST - TEST ACTIVITY I

1. On the earth, there is (more land than water, more water than land).
2. When we speak of only ½ of the earth, we use the word _____.
3. Lines that run east and west on the globe are called _____.
4. On the earth we measure all places east and west from one another from an imaginary line that runs through a small town in Eangling. The name of the town is _____. The line is called _____.
5. Name the seven continents. 1. _____ 2. _____
   3. _____ 4. _____ 5. _____
   6. _____ 7. _____
6. Put a ✓ by the continent on which you live. Put an E by the continents that the Equator runs through.
7. What 3 continents are grouped around the North Pole?
   _____ _____ _____
8. The largest ocean is the _____.
9. The Tropic of Cancer is (north, south) of the equator.
10. We measure all distance north and south starting at (north pole, equater).
11. If you were to travel from the equator to the Antarctic Circle, you would travel (north, south, east).
12. Name the states that border your state. _____
    _____
13. What is a "junction?" _____.
14. Show the directions on a map legend. 
15. The two continents that are large islands are _____ _____
16. Each time zone is divided into (180, 15, 23½) degrees of longitude.
17. On which continent would you be if you visited the countries of China, India, and Iran? (Africa, Asia, South America)
18. Vegetation means _____.
19. 

means _____.
20. An intersection is _____.
21. What state is directly north of your state? _____.



Follow the instructions, in order. Number each X as you write it, carefully.

1. Place an X at the corner of 5th and Ford Streets.
2. Walk two blocks east, three blocks south, two blocks west, one block north and place an X at the corner where you arrive.
3. Walk one block east, three blocks north, one block east and place an X at the corner where you arrive.
4. Walk five blocks south, two blocks west, three blocks north, one block east and place an X at the corner where you arrive.
5. Walk three blocks west, one block south, five blocks east, and place an X at the corner where you arrive.
6. Walk one block east, three blocks west, three blocks north, and place an X at the corner where you arrive.
7. Place another X as far from the west and south borders of the map as your last X is from the west and north borders of the map.
8. Start north, zig-zag north and east, alternating one block at a time and walking five blocks in all. Place an X at the corner where you arrive.
9. Start at the opposite corner of the block southeast of where you placed the last X, walk two blocks west and place an X at the corner you arrive.
10. Go three-fourths of the way around a square that has the length of two blocks on each side, starting where you placed the last X and ending south of your starting point. Place an X at the corner where you arrive.

Compass Rose Exercise

The object of this exercise is to provide students with some practice in using compass directions. The student's desk or classroom can be the center of the compass.

1. The office is located _____of this room.
2. The kindergarten room is located _____of this room.
3. The gym is _____ of here.
4. The playground is _____of here.
5. The street is _____of here.
6. The gym is _____of the office.
7. This room is _____of the street.
8. Your home is _____of this school.
9. The stage in the gym is _____of where you eat lunch.
10. The first grade room is _____of this room.

Map Exercise

Remove a roller map from the wall and spread it on the floor. A student removes shoes and walks across the map. The eyes are a space ship looking at earth.

Check the scale of the map. Convert this to a distance the eyes are from the floor and imagine what an alien would see. For example, the map scale is one inch equals 100 miles. Eyes that are four feet from the floor would actually be 4,800 miles out in space.

Encourage students to discuss what they can and cannot see. How much of a globe can one see at a time? If the "spaceship" (eyes) are 4,800 miles away and one can see North America and little else, is the earth large or small?

WYOMING OFFICIAL HIGHWAY MAP

Using The Legend of The Map ACTIVITY IV

DIRECTIONS: Answer the following questions using the legend of the "Wyoming Official Highway Map."

1. One inch on the map equals approximately _____miles.

2. Fifty miles is represented by _____inches on the map.

3. Figure how far it is between Rock Springs and Pinedale by adding the distance between arrowheads. _____

   Is this the same distance as when you use the map scale? _____

4. Interstate 80 is a major east-west highway in southern Wyoming. Name the cities with populations over 5,000 through which Interstate 80 or a business route probably passes.

   _____

   _____

5. How many traffic interchanges are there on Interstate 80 including those in Cheyenne through those in Rawlins? _____

6. Draw the symbol for the state capital. _____

   What is the name of the state capital? _____

7. What is the symbol for a point of interest?_____

   Name three points of interest near the historic Oregon Trail between Torrington and Casper.

   (1) _____ (2)_____ (3)_____

8. What is the symbol for a county seat?_____

   Name any three county seats in counties not touching each other.

   (1) _____(2)_____(3)_____

9. Name two towns with 5,000 population or less that have airports near them.

   (1) _____ (2)_____

10. Name two National Forests in Wyoming, one from each side of the Continental Divide.

    (1) _____ (2)_____

NATIONAL (or FEDERAL) LANDS IN WYOMING

DIRECTIONS: Use the map and its indexes to help answer the following:

1. Locate and name five National Forests.

   _____

   _____

   _____

   _____

   _____

2. Locate and name Wyoming's only National Grassland. _____

3. Name one Indian reservation. _____

4. Locate and identify a National Monument. _____

5. Locate and name a National Historical site. _____

6. Name two National Parks.

   _____

   _____

7. Name two National Recreation areas.

   _____

   _____

LARGER COMMUNITIES

DIRECTIONS: Using that part of the "Wyoming Official Highway Map" which has insets showing seven towns, complete the following:

_____ 1. How many of the communities are served by more than one railroad?

_____ 2. How many communities have markings showing a river or creek passing through the town?

_____ 3. How many of the seven communities are <u>not</u> served by a railroad?

_____ 4. How many communities have airports marked in the inset maps?

_____ 5. (Use the state map) Do all seven communities have airports marked on the large map?

_____ 6. On which interstate highway are the greatest number of communities located?

_____ 7. Do community boundaries (city limits) tend to be straight lines or curved?

8. What is the name of the railroad passing through four of the seven communities?

_____

9. Name the community in or near where each of the following is located:

_____ a. University of Wyoming

_____ b. Wyoming Girls' School

_____ c. State Penitentiary

_____ d. Fort Mackenzie

_____ e. Fort Caspar

_____ f. State Children's Home

_____ g. The community that does <u>not</u> have a fair or rodeo grounds.

SHOPPING AREAS

DIRECTIONS: Not all cities and towns have complete shopping areas. So, many people in these towns often travel to nearby towns for much of their shopping. Below is a list of towns and cities. Where might the residents of these towns go to buy things which they cannot find in their home town?
(Note: Use Wyoming Index of Cities & Towns)

TOWN	SHOPPING AREA
1. Alcova	Casper
2. Piedmont	
3. Bill	
4. Lost Cabin	
5. Hartville	
6. Pavillion	
7. Big Trails	
8. Moran Junction	
9. Pitchfork	
10. Elk Basin	
11. Baggs	
12. Horse Creek	
13. Fairview	
14. Farson	
15. Tie Siding	
16. Grover	

HIGHWAY NUMBERS

DIRECTIONS: Write in the number of the highway one would use driving a car from one location to another.

_____ 1. Creston Junction to Baggs

_____ 2. Lander to Farson

_____ 3. Casper to Sheridan

_____ 4. Newcastle to Lusk

_____ 5. Moran Junction to Dubois

_____ 6. Albin to Pine Bluffs

_____ 7. Red Desert to Table Rock

COMPASS DIRECTIONS

DIRECTIONS: Indicate the compass direction one would follow to fly directly from the first location to the second. Use the most nearly correct reading of the eight (8) major compass directions. (Cardinal and intermediate directions.)

_____ 1. Rock Springs to Gillette

_____ 2. Jackson to Torrington

_____ 3. Cheyenne to Sheridan

_____ 4. Riverton to Kemmerer

_____ 5. Laramie to Newcastle

_____ 6. Thermopolis to Wheatland

_____ 7. Afton to Lusk

_____ 8. Rawlins to Lander

_____ 9. Gurnsey to Big Piney

_____ 10. Saratoga to Buffalo

IS THE DAM RIGHT?

Teacher's Guide

Objectives

This exercise attempts to encourage the use of cognitive reasoning skills. Reading the map and the directions requires observation and reflection; the questions require analysis and answers depend on synthesis skills, inference making and some practice in making generalizations. The exercise can make use of current events and touch upon choice-making in Wyoming and the region during our present energy crisis.

Procedure

This is a conventional activity. Hand out the student sheet which describes the situation. You can elaborate and explain as needed. Also hand out the map and try to make certain that students are properly oriented. Let them work individually if you wish. A group of three students would probably be more ideal. Have them make their lists and cast their vote. Debrief the exercise by discussing the lists. Make a master list for all to see. After discussion and thought, does anyone wish to change his vote? Ask the students if they think that people should take this much time to decide how to vote on other matters. Evaluation of students can be made on the quality of the lists, observed behavior during the process and involvement in discussion.

Advantages of Building the Dam

1. More energy would be created which would help Old Town, the equipment of the Gem Mine and people at a greater distance. The price of electricity should go down as more is produced. New growth would be possible.

2. More water for irrigation means more land could be cultivated, larger yield of crops, possibly a greater variety of crops and probably more income to the farmer. As production increases, the price of food should go down and farm income up.

3. The dam will provide additional jobs both during and after the building of the dam. More jobs means more business and a higher standard of living for everyone.

4. The newly formed lake will provide a variety of recreational opportunities. This means better use of leisure time and a greater variety of businesses.

5. Moving the community will provide the opportunity to get rid of slums and undesirable parts of town. The people can start fresh. New schools, recreational facilities, etc., and better community planning would be an improvement. Technical advances since the original town was built could be incorporated (e.g., underground utilities including power and phones).

Problems of Building a New Dam

1. The use of the land will be changed. Land covered by the new lake and the new town will have to be paid for and/or replaced.

2. New transportation into and within the new town will have to be constructed. What is to be done about highways, the railroad and bridges?

3. Someone has to pay for all of this. Who?

4. Locating a new town nearer the mine could cause health and safety problems.

5. Locating the town downstream from a dam could be risky.

6. Moving a community is not easy. It takes time and money. What happens to places people have valued--parks, historic places, cemeteries, etc?

7. Larger towns and the new town probably would be more heavily populated, often have more civic problems (crime, garbage, etc.) than do smaller, older towns.

8. Encouraging growth can lead to abuses in use of natural resources and the tourism at the new lake might create additional problems.

9. In this day and age, governmental agencies of all kinds will be involved before, during and after the building of the dam. This could create problems involving the role of government.

Note

Not all students will complete such lists as outlined here. Some students will think of additional advantages or problems. The above lists are suggestions of things to look for and discuss.

IS THE DAM RIGHT?

The people of Old Town have a problem. Should they agree to build and move into a new town?

Old Town is now located on the American River just below the point where Fish Creek flows into the river.

A number of leaders in business and government want to build a dam below Old Town in Rabbit Canyon. The owners of the Gem Coal Mine, where many of the townsmen work, want the new dam.

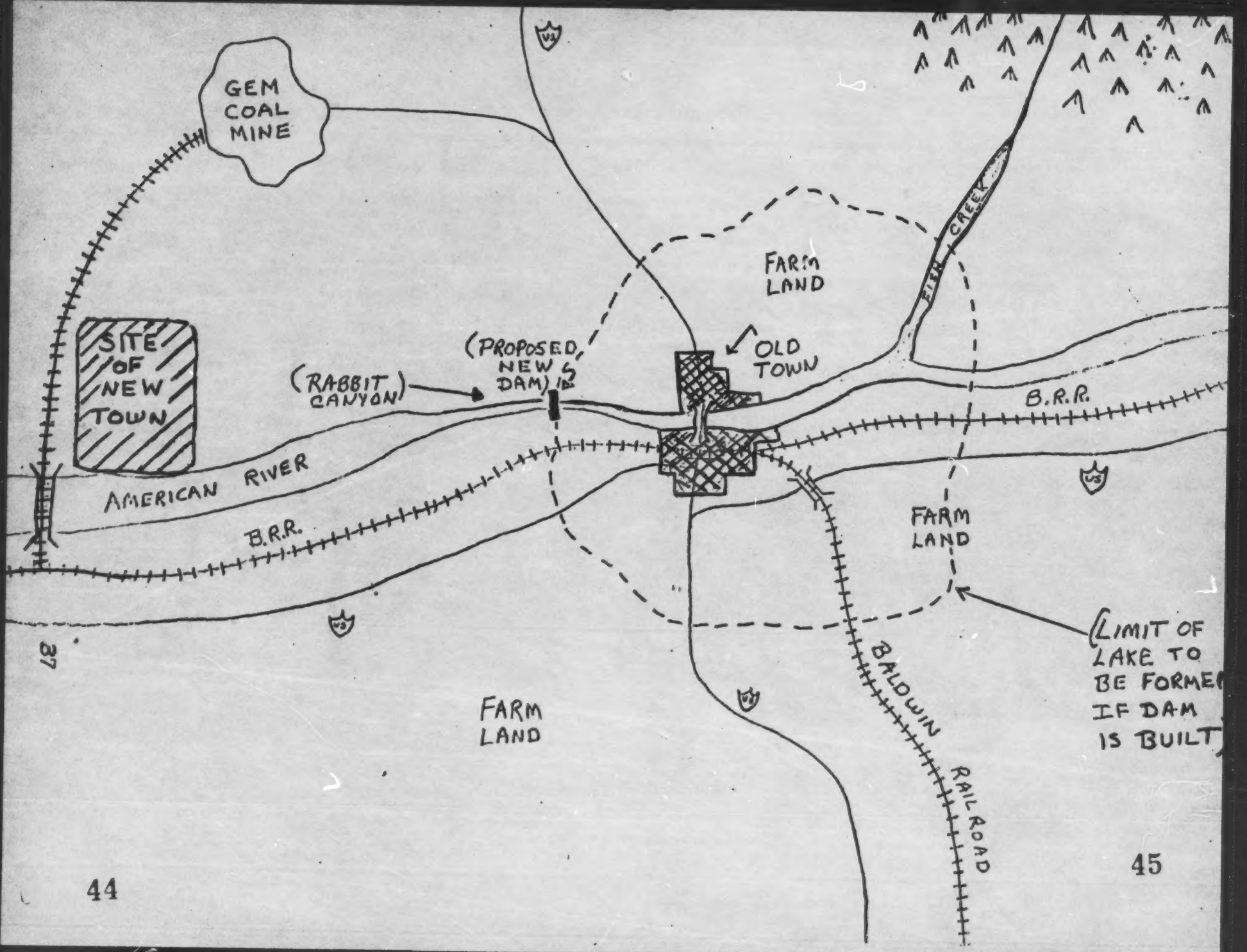
The citizens of Old Town, including you, are going to vote whether they want the dam or not.

Before you vote, you decide that it would be the smart thing to make two lists. One list would have all the advantages of building a new dam and the other list would have all the problems created by building a new dam.

You have a map which locates Old Town, the Baldwin Railroad, the highways and bridges, the rivers and mountains and the farmland that is nearby. The map also uses dashed lines to show the limit of the lake formed by the new dam, the location of the new dam and where the experts want to locate the new town.

On another sheet of paper you make your two lists. One list has all the advantages you can think of and all the problems that a new dam would create.

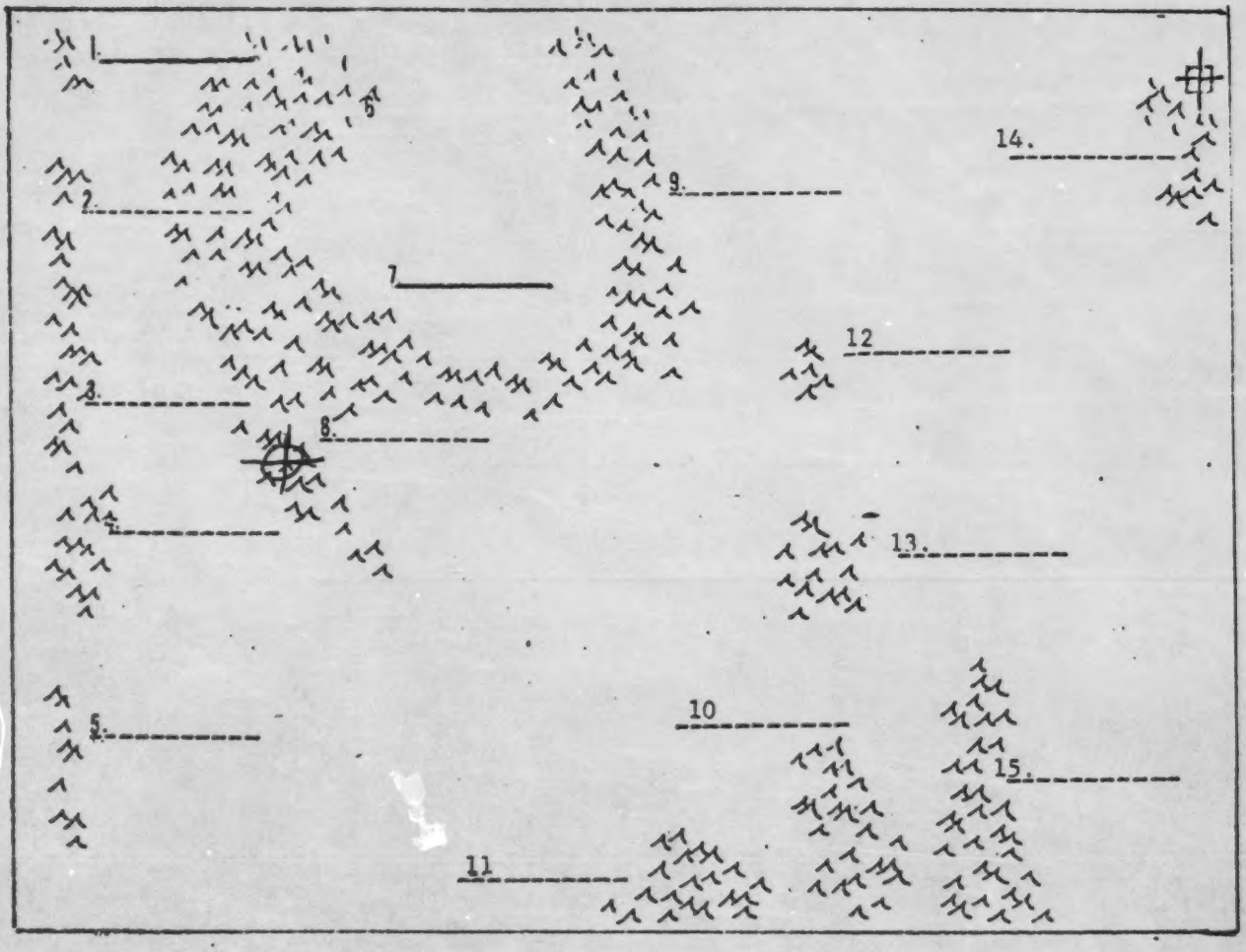
After making the two lists, how will you decide to vote? What caused you to vote that way?


GEM COAL MINE
SITE OF NEW TOWN
AMERICAN RIVER
B.R.R.
(RABBIT CANYON)
(PROPOSED NEW DAM)
OLD TOWN
FARM LAND
FISH CREEK
B.R.R.
FARM LAND
FARM LAND
(LIMIT OF LAKE TO BE FORMED IF DAM IS BUILT)
BALDWIN RAILROAD
87
44
45

ACTIVITY VI

MOUNTAINS

Using the map below, place the letter indicating the correct name of the mountains in the space provided.



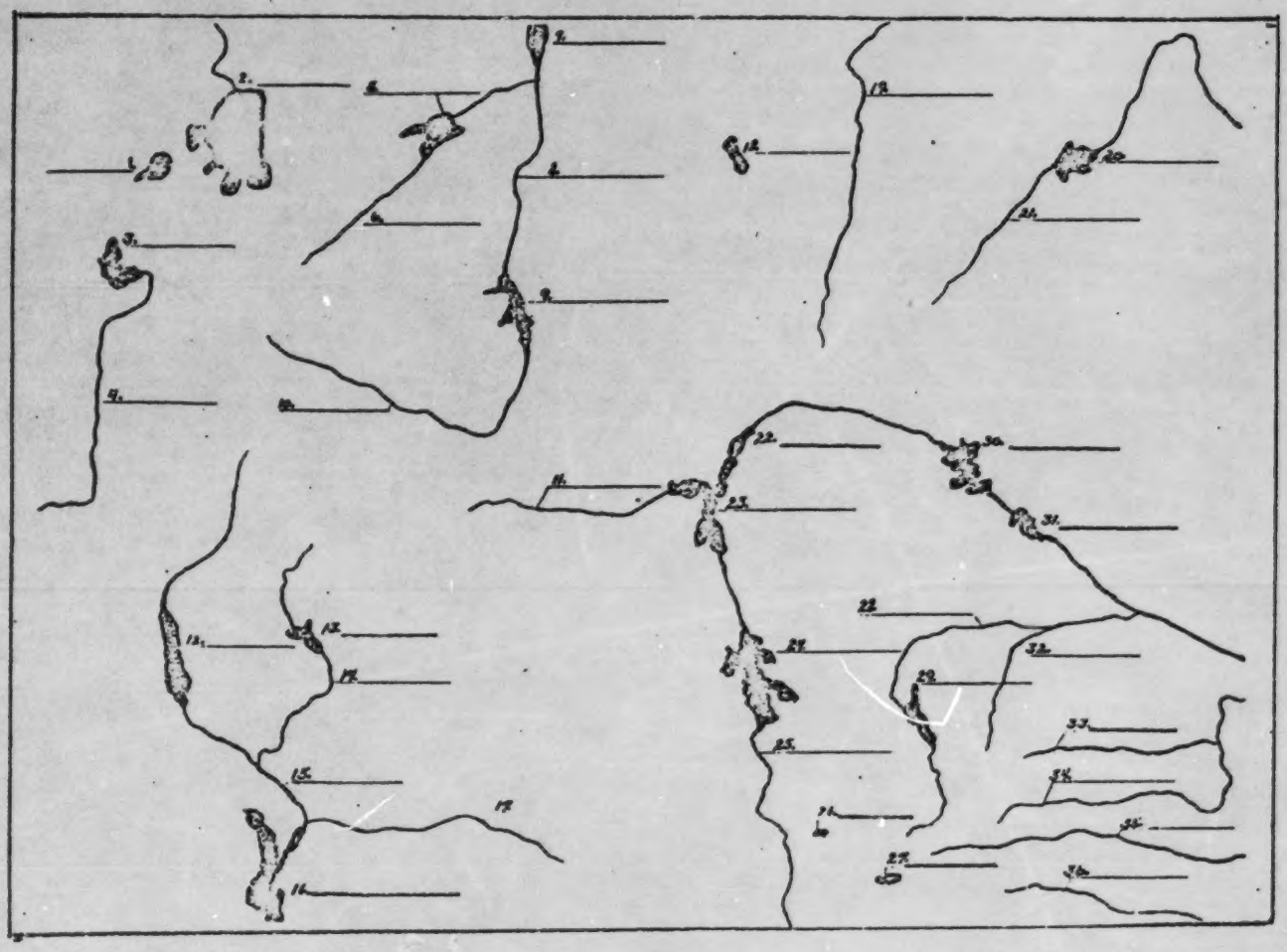
A. Absaroka Range
B. Bear River Divide
C. Black Hills
D. Big Horn Mountains
E. Carter Mountains
F. Gallatin Range
G. Haystack Range
H. Laramie Mountains
J. Pumpkin Buttes
K. Salt Range
L. Sierra Madre
M. Snake Range
N. Snowy Range
O. Teton Range
P. Wind River Mountains

_____ This symbol indicates the highest elevation in Wyoming

_____ This symbol indicates the lowest elevation in Wyoming

RIVERS, LAKES AND RESERVOIRS OF WYOMING

Using the list of Wyoming's waters, write in the number of the river, lake or reservoir indicated on the map below.



1. Alcova Reservoir
2. Big Horn Lake
3. Big Sandy Reservoir
4. Boysen Reservoir
5. Buffalo Bill Reservoir
6. Flaming Gorge Reservoir
7. Fontenelle Reservoir
8. Glendo Reservoir
9. Guernsey Reservoir
10. Jackson Lake
11. Keyhole Reservoir
12. Lake DeSmet
13. Lake Hattie
14. Lake Marie
15. Lodgepole Creek
16. Pathfinder Reservoir
17. Seminoe Reservoir
18. Shoshone Lake
19. Yellowstone Lake
20. Wheatland Reservoir
21. Belle Fourche River
22. Big Horn River
23. Bitter Creek
24. Crow Creek
25. Green River
26. Horse Creek
27. Laramie River
28. Little Bear Creek
29. North Platte River
30. Powder River
31. Sandy Creek
32. Sybille Creek
33. Shoshone River
34. Snake River
35. Sweetwater River
36. Wind River

Rock Collecting Areas

in

ACTIVITY VIII

WONDERFUL WYOMING

"The Equality State"

Our three main collecting areas lie in the most sparsely populated regions of Wyoming, and most of this land is in the public domain.

First, is the Red Desert or Great Divide Basin where jade is found. Second, is the Green River Basin with the unusually beautiful Eden Valley Woods. Third, is the Wiggins Fork of the Wind River with its unique limb casts and petrified woods of every color. Next will be listed the smaller more localized collecting areas and certain fossil beds, and unusual areas of geologic interest.

Jade country extends for better than one hundred miles both east and south of Jeffrey City and better than fifty miles west and north. Recent lode discoveries have been made as far east as Douglas and Glendo. However, the main prospecting area for the placer-like deposits of water-worn pebbles or boulders of jade centers around the intersection of the counties of Carbon, Natrona, Fremont and Sweetwater. Most jade is found on or protruding from the surface in dry washes, wind-blown areas, or where some form of erosion has taken place. Any heavy rain can completely renew a heavily prospected area. Jade should be easy to recognize because it is always heavier than the attendant country rock and most likely will have an outer rind of weathered material colored from shades of red to tan to white. Due to its fibrous structure, it resists chipping but when a flake is exposed, it generally shows a granular structure. Its color may grade from olive to green to black, and it may show inclusions of quartz crystals and flecks of various colors. Only rarely will the beautiful applegreen jade be found, but all colors are becoming more valuable due to scarcity. Naturally, no one will give a specific location for jade, but a very favorite area is along the south side of the Green Mountains just west of Lamont. Another is along the escarpment of the Beaver Rim which extends northeasterly from South Pass to Rattlesnake Hills, north of Pathfinder Reservoir. Nearly all the natural springs in this area are littered with chippings from Indian artifacts. Many choice outcroppings of agate and jasper and even petrified wood have been traced by these chippings.

Farson is the heart of the famous Eden Valley petrified wood area. This great basin area, surrounded by mountains on all sides, was once a great inland lake, nearly the size of Lake Michigan. In the warm moist climate of the Eocene, great forests flourished around the edge of Gosuite Lake. During periods of increased moisture, the lake would expand and drown the bordering growths of aquatic rushes and the forests of palm, fig, and magnolia, as well as pine and the hardwoods. Heavy coverings of algae coated this drowned timber and subsequent deposition of sediments and blanketing showers of volcanic ash supplied the silica which gradually petrified the slowly carbonizing wood. Today, erosion is bringing closer to the surface this beautifully petrified wood, still enclosed by a rind of equally petrified algae. Great quantities of this wood lie on the surface throughout the basin, but weathering quickly destroys its ability to take a high polish. You must dig with pick and shovel to reach the choice unweathered limb sections. However, the palm wood, easily identified by its vertical pith, when found on the surface usually has a "desert" polish from windblown sand and is still highly polishable. Jointed "bamboo" cane material is a great prize as it is so highly silicified that it is

nearly perfectly preserved. Extensive diggings covering many acres are found on both sides of a dry wash, nine miles east of the turn-off to the Big Sandy Reservoir in T. 27 N., R. 105 W. and also at the extensive "Blue Beds" in the south half of T. 23 N., R. 109 W. Many of the dry lake beds will produce limb casts and palm wood through the heaving action of frost. In the Sublette Flat area, just a township west of Big Sandy Reservoir, are found beautiful round, small, delicate limb casts of milk-white agate with internal tube formations in some, while others, when sawed, show the rare flash of colors of the iris agate.

Another area which has eroded sufficiently to expose much wood is located on the Hay Ranch in T. 25 N., R. 103 W., sections 1, 2, 11 and 12, and can be definitely located by "pockmarked" diggings.

In the shallow waters of the great Gosuite Lake, myriads of fish were suddenly trapped and entombed in the fine-grained Green River shales, where their fossil imprint is perfectly preserved as though pressed in the pages of a book, and can be exposed by carefully splitting the layered shales. These will be found wherever the fine-grained, buff to white colored shales are exposed throughout the basin, but the finest "fish quarries" lie just north of Kemmerer. Fossil turtle and crocodile bones are common. Fly larvae and myriads of winged insects have left their imprint as well as leaves, flowers, fruits and seeds. Reef-like accumulations of the Goneobases snails which existed only at certain depths are so highly silicified that the name of Turritella Agate has been given to the dark brown, shading-to-black, gem-grade material. The lighter brown weathered material does not take a high polish. Many outcroppings occur in T. 17 N., R. 94, 95, 96 and 97 W., south of Wamsutter. Many unusually small-sized limb casts, even to lead pencil size, are also found in this area. Certain of the algae formations, those containing large eye-shaped configurations, make very unusual gem stones and are found around Oregon Buttes. Even early man had an eye for this material as beautifully worked Folsom points flaked from this silicified algae have been found.

Dubois is the gateway to the fabulous Wiggins Fork limb cast area and the Frontier Creek petrified woods. Drive twenty-five miles north on the Horse Creek road until reaching the Twin Cabins Ranger Station on the edge of the wilderness area. Here is high alpine scenery at its very best with lush meadows surrounded by rugged peaks reaching to 12,000 feet.

Sturdy boots and comfortable pack frames are necessary as well as a hammer and rock chisel. These are needed to work out limb casts from the cement-like conglomerate which imprisions these beautiful agate-filled, sometimes amethyst or sagenite-filled limb casts. Work the stream gravels and follow up any promising side streams or work the precipitous cliffs of eroding conglomerate where the limb casts can be seen protruding.

All along the east side of Norton Peak is a highly productive area where many shattered pieces of limb casts litter the talus slopes, having fallen from the cliffs above. Very sturdy hikers may travel for 12 miles up Wiggins Fork, past the lightening-caused burned area and up Emerald Creek and as far as Emerald Lake. For those who are not up to the strenuous task of climbing, the broad expanse of river gravels can be very rewarding. In places these gravels are $\frac{1}{4}$ to $\frac{1}{2}$ miles wide, and each yearly thaw and flood water may expose colorful moss agates, limb casts, or opalized and petrified woods.

If you seek the very colorful petrified or opalized woods, follow Frontier Creek which forks to the left and again search river and side stream gravels. Just six years ago, forty-nine round trunk sections which one man could not have even lifted were counted along a three-mile stretch. However, in two years these had disappeared, having been pirated by commercial interests. Still

much remains and more weathers out each year.

Approximately six miles up Frontier Creek, is a prohibited collecting area, surrounding a standing petrified forest from which came many amethystlined limb sections. Now the Forest Service and Bureau of Land Management have posted this area to preserve this outstanding example of petrifaction. Please cooperate in every way with this effort.

Many of the trails ascending the cliffs will show hoof prints of mountain sheep and the wooden structures of winter elk-hunting camps will be seen.

Another good collecting area lies above the Horse Creek Ranger Station, up Burrows Creek which cascasdes from the east side of the 11,633-foot Ram's Horn Peak. Yet another good area is along the banks of Four Mile, Five Mile, and Six Mile Creeks, each of which branches to the east of DuNoir River, eight miles northwest of Dubois. A good prospector would also carefully examine the river benches along both sides of the DuNoir.

Now, to list miscellaneous areas of great interest: Well worth seeing is the historic South Pass and Atlantic City area where the rushing hordes of California gold seekers blindly trampled over rich placer gold deposits. Just a short distance north, on Highway 28, is where U. S. Steel's new open-cut mine is processing Pre-Cambrian taconite ore. Technological progress has solved the problem of beneficiating low-grade ore to the point where our iron resources are actually expanding.

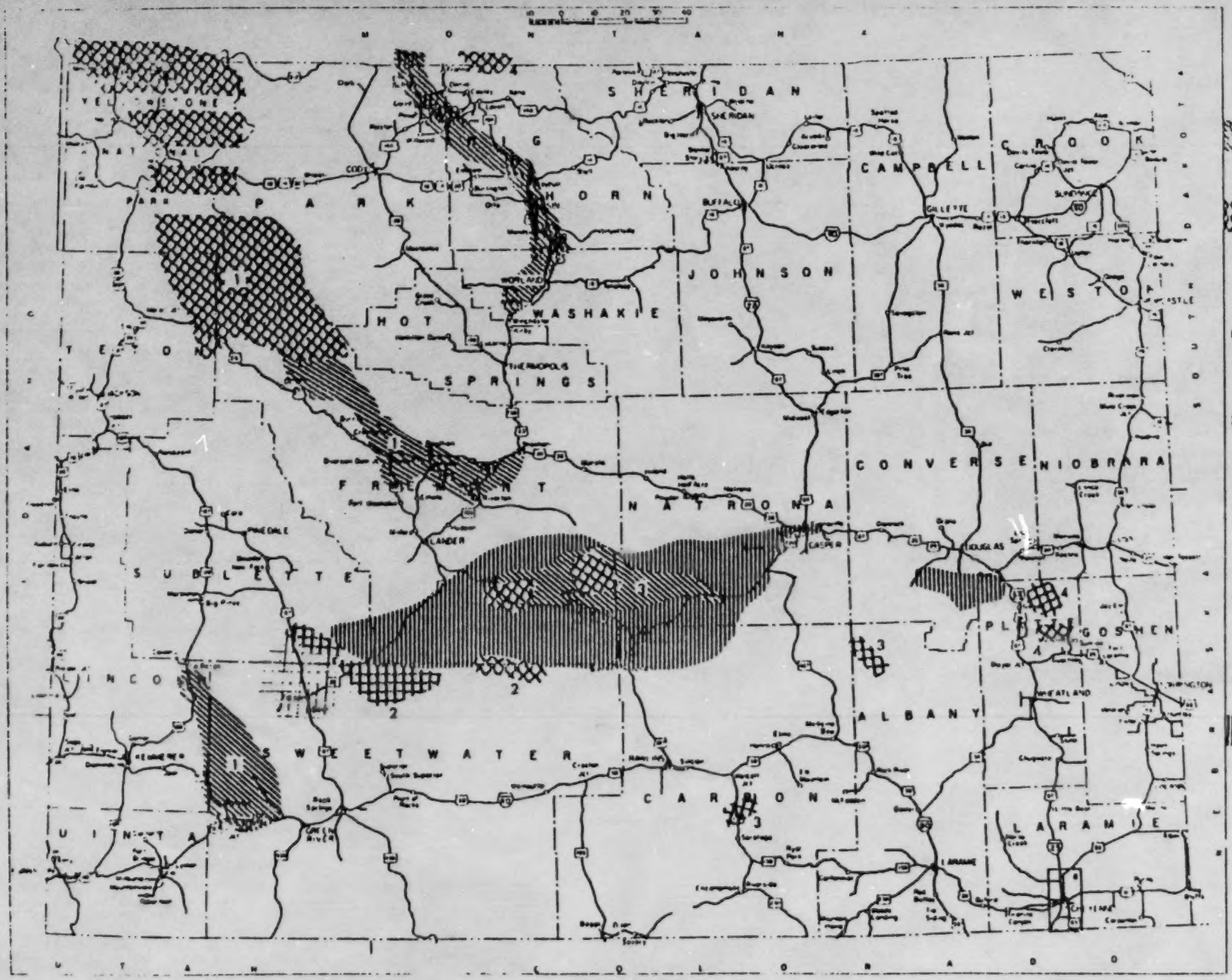
The Gas Hills uranium district lies between Jeffrey City and Moneta where secondary uranium ores, autunite and uranophane occur in sandstone lenses accessable by the very economical open-cut mining method. Much of our Wyoming agate and calcite under black light show the familiar green fluorescence of uranium salts. Sweetwater agates, which are small water-worn pebbles of moss agate, are an interesting collector's item and are found along West Sage Hen Creek in T. 31 R. 89 and 90 W. These fluoresce vividly as does the more massive dendritic moss agate found throughout the Shirley Basin north of Medicine Bow. Here also, in Townships 27 and 28, Ranges 78 and 79 were extensive exposures of petrified woods. While largely worked, this area still produces.

In the Copper Mountain area, northeast of Shoshoni are many old mine dumps which are producing for the careful prospector beautiful specimens of malachite, azurite, chrysocolla, lepidolite, and some tourmaline. Search T. 40, R. 92 and 93.

The Glendo area has produced gem-quality seam agate in fractured limestone outcroppings as well as very unusual colored stalactites formed in cavities in the limestone. Bands of clear stalactites are very common in these seams which are sometimes a foot wide, and this material absorbs colored dyes very readily.

WYOMING PUBLIC LANDS

Some 18 million acres of public land in Wyoming are managed by the Department of the Interior's Bureau of Land Management. Rock collecting on these lands is a recreation activity that has grown by leaps and bounds. In general, the public lands are open to any person to take and remove rock material without charge, for non-commercial purposes. A free map showing the general location and main access points to the public lands in Wyoming can be obtained from the BLM State Office, 2002 Capitol Avenue, Cheyenne, or any of the six district offices throughout the State.



51 MAP SHOWING MINERAL AND GEM COLLECTING AREAS IN WYOMING 52

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TYPES OF MAPS THAT MAY BE MADE

The actual construction of maps by students of various materials will help them to see a map is not just a piece of paper, but a scale model of a part of the world in which they live, and that it can take many forms.

1. Geological creation
2. Indian tribes
3. Early explorers
4. Early forts
5. 4 territory make-up
6. Wyoming territory
7. Rivers
8. Cities
9. National forests and grasslands
10. Historical sites
11. Industries
12. Land formations
13. Early settlement
14. Early trails
15. Airports and railroads
16. Places of interest
17. Manufactures - Products
18. Minerals and gem stones
19. Agriculture areas and products
20. Political subdivisions - counties, irrigation districts, etc.
21. Demographic information
    - population density
    - ethnic location
    - mine location
    - etc.

SUGGESTED MATERIALS TO BE USED

salt and flour

plywood

paper mache

egg shell

sawdust and wallpaper paste

burlap

flannel

cotton material and embroidery

sand

yarn

clay

plaster of paris

seeds

plastic or glass mosaic

small pebbles

small samples of minerals and/or gemstones

SUGGESTED GEOGRAPHIC AND GEOLOGIC VOCABULARY

alluvial fan
area
avalanche
axis
basin
bay
beach
boundary
butte
canyon
capital
capitol building
city, cities
compass
continent
contour
creek
current
dale
desert
direction
dock
dune
elevation
equator
fault
flat
flood
flood plain
foothills
fork
forest
fossil
glacial
glacier
harbor
hemisphere
hills
inland
island
isthmus
lake
landslide
latitude
legend
levee
longitude
lowlands
marsh
mesa
mountains
North Pole
ocean
oxbow
pass
peak
peninsula
physical
pictorial
plain
plateau
pond
prairie
range
relief
reservoir
river
river bed
scale (of miles)
sea
source
South Pole
sphere
springs
stream
swamp
table mountain
tributary
uplift
valley
wash(dry)

VOCABULARY

BEARS	PIKA
PLATEAUS	ASPEN
PRAIRIE DOGS	SPRUCE
EMBLEMS	CONTINENTAL DIVIDE

Write these words in crayon. Write all the names for places or things in red. Write words that do something in blue.

What did you discover about these words? How many words are in red? in blue?

VOCABULARY

Look up these words in the dictionary and give their meanings.

1. Desert_____

_____

2. Valley_____

_____

3. Peak_____

_____

4. Bighorn_____

_____

5. Narrow_____

_____

6. Steep_____

_____

7. Lonesome_____

_____

8. Grizzly Bear_____

_____

SELECTED

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For Geology and Geography-----Special Helps---

Wyoming Geological Museum
University of Wyoming
Laramie, Wyoming

National Geological Survey
Laramie, U. of Wyoming

Wyoming Mining Association
West Lincolnway
Cheyenne, Wy.

Wyoming State Government

State Information Office

Barrett Building

Phone: 777 - 7011

Agriculture

2219 Carey Ave.

Phone: 777-7321

Archives Museums & Historical

Barrett Building

Phone: 777-7518

State Engineer

Barrett Building

Phone: 777-7354

Environmental Quality

Hathaway Building

Phone: 777-7391

Game & Fish

5400 Bishop Blvd.

Phone: 777-7735

Highway Department

Phone: 777-7475

State Government (continued)

Recreation

604 E. 25th

Phone: 777-7695

Travel Commission

Sw Of Cheyenne

Phone: 777-7777

Water Development Commission

Barrett Building

Phone: 777-7626

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Wyoming Directory.....Manufacturing and Mining

Wyoming Mining Association....Great Strides Forward....pamphlet

INSTRUCTIONAL MATERIALS CENTER - CHEYENNE

FILMS

BIG WYOMING MP 93
C., 18 min., Lang Arts, S.S., Elem., J.,S
The vastness and terrain are explored in Big Wyoming.

DIRECTIONS FOR BEGINNERS: NORTH, SOUTH, EAST, WEST MP 1534
COR, C 11 min. SS., SCI., PRI., Inter.
Steve learns different ways to find North, using the sun, the stars, and with a compass.

INTERIOR WEST: THE LAND NOBODY WANTED MP 749
EBEC C., 20 min., S.S., Elem., J.,S
Bounded on the east and west by timber-covered mountains, the Interior West is a land of high broken plateaus and lonely stretches of desert. Increasing demands on its limited water supply, disputes over the use of the land, and competition for control of its natural resources.

MAP SKILLS: Using Scale MP 647-A
COR., 11 min., S.S., Math, Inter, J., S.
Compares scale models with actual objects to help define scale. Introduces the main types of map scales, shows how to use them to estimate distances, the difference in large scale and small scale maps.

PREHISTORIC TIMES MP 1563
COR., C 10 min., S.S., J.,S.
This film will help students to briefly summarize the present scientific explanation of the formation of the atmosphere, oceans, continents and the beginning of life.

ROAMIN' WYOMING MP 95-96
WTC B/W, 18 min., S.S., Lang. Arts, Elem., J.,S.
Study of the terrain, animals, and mountain areas of Wyoming.

ROCKY MOUNTAINS-GEOGRAPHIC REGION MP 240
COR B/W, 11 min., Lang. Arts, S.S., Elem.,J.
Photographed in Alaska, Canada and the Rocky Mt. States, presents a geographic overview of the Rocky Mountains, one of the most spectacular features of the North American continent.

THE DINOSAUR WHO WONDERED WHO HE WAS MP 1539
COR C21 hang, Sec., K., Prim
This imaginative tale of Diplodocus, a little dinosaur will be invaluable in the science classroom, and will inspire creative expression, dramatics and art activities.

WYOMING MP 34
B/W, 11 min., S.S., Lang. Arts, Elem., J.,S.
History and travels in Wyoming

WYOMING - A People Thing MP 66
With Curt Goudy

WYOMING FROM THE BEGINNING MP 165
Bill Bragg Narrator

WYOMING WATERWAYS MP 67
WTC B/W, 20 min., S.S., Lang. Arts, Elem., J.,S.
Rivers and streams in Wyoming.

The school district Curriculum Library is preparing a catalog of the materials located there. This catalog should be ready by the fall of 1980. It will include several filmstrips on Wyoming geography, climate, general geographic skills, and geology.

Both the Wyoming Travel Commission and the Wyoming Fish and Game Department maintain film libraries. These films may be rented by the schools. For most films there isn't a rental fee.

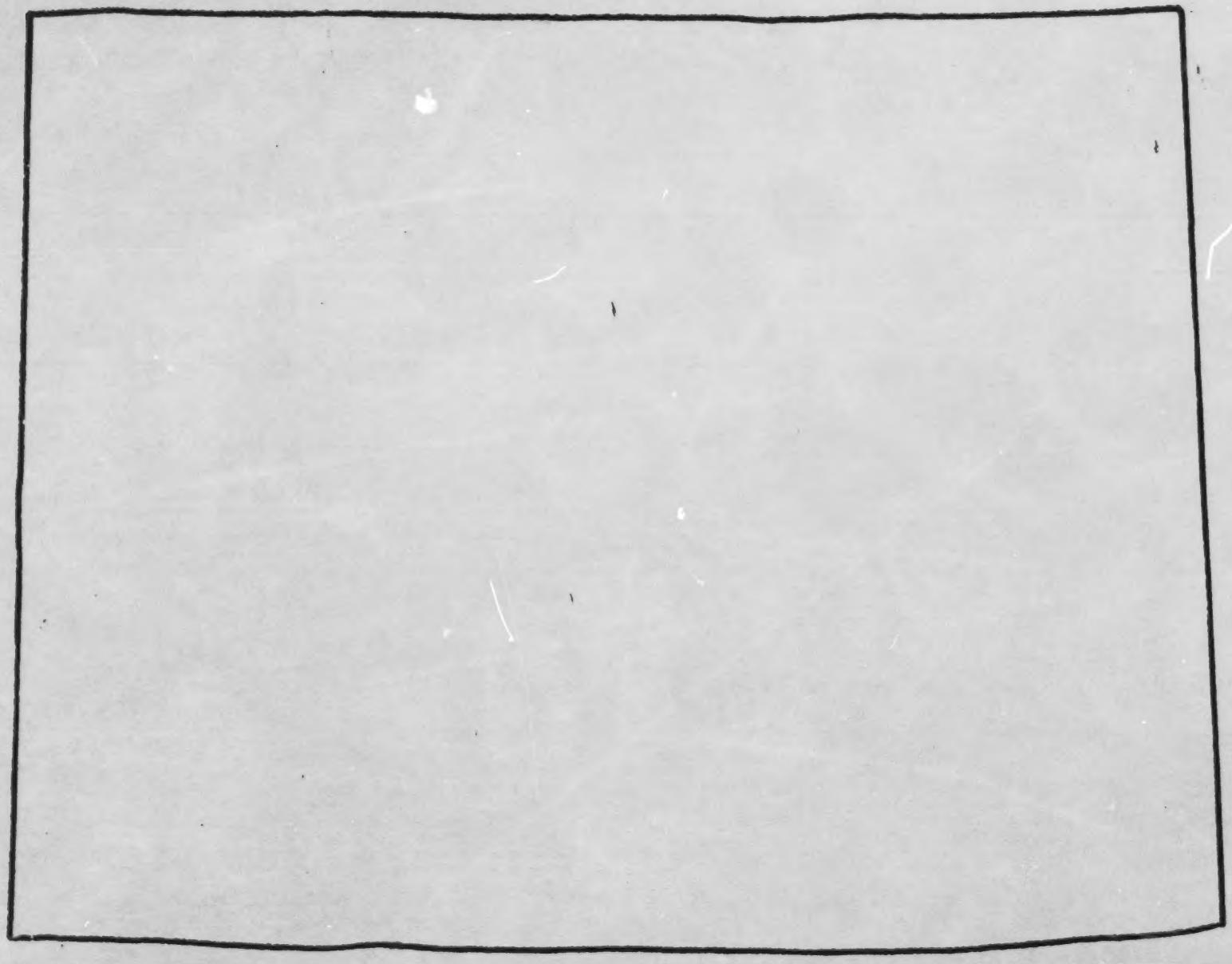
IN THE KIT:

Wyoming Rocks and Minerals
Wyoming Dinosaurs
Wyoming Weather
} film strips

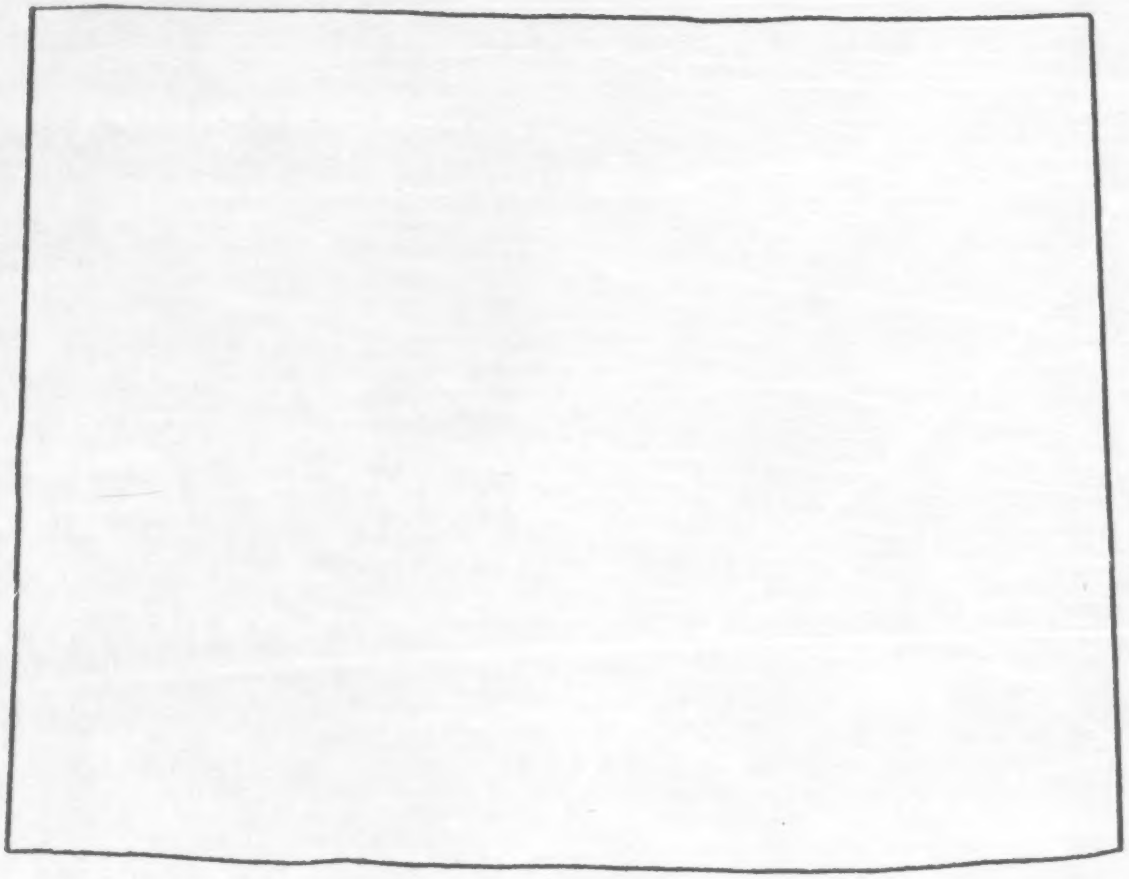
This is Wyoming ------- slide tray

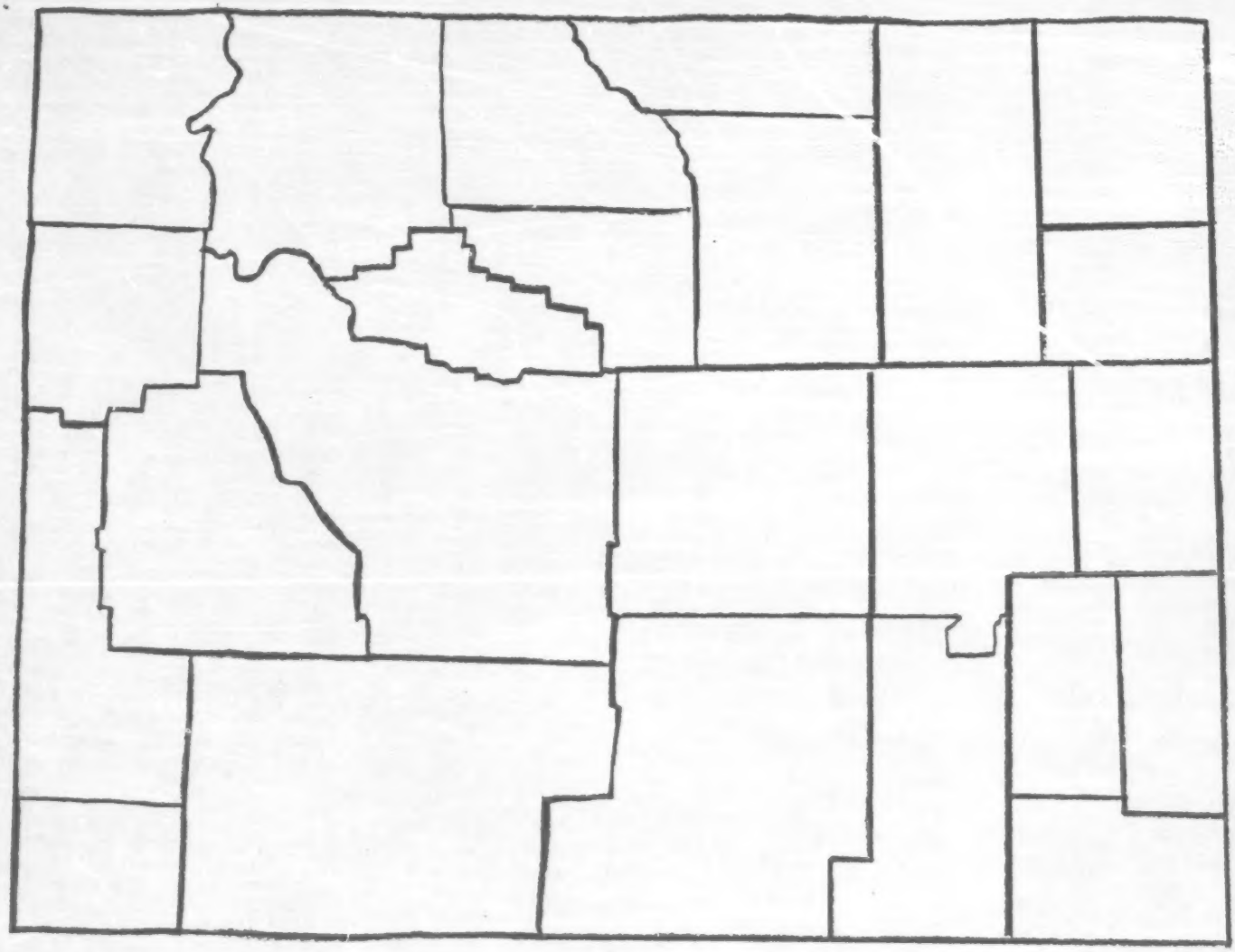
MAPS

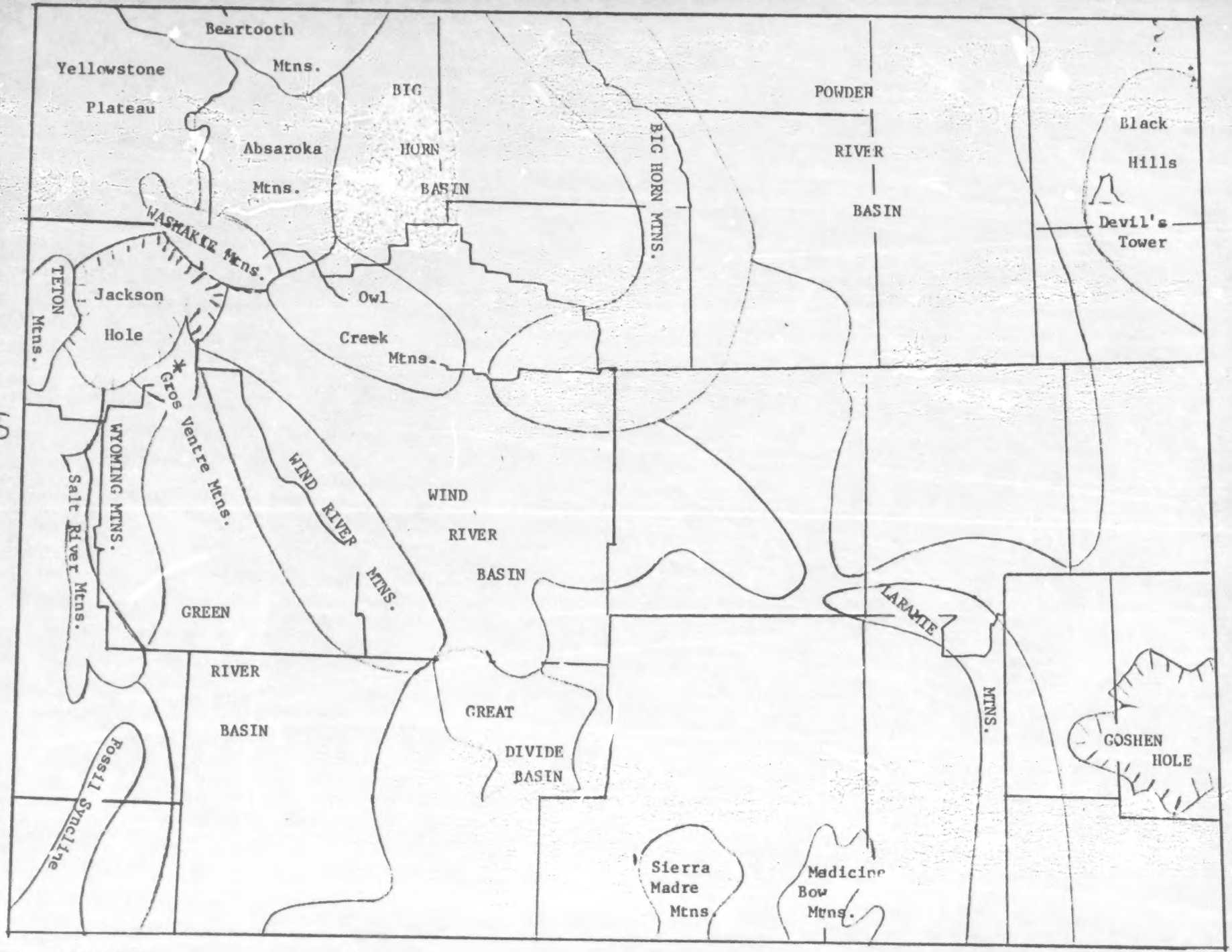
WYOMING OUTLINE MAP



WYOMING OUTLINE MAP

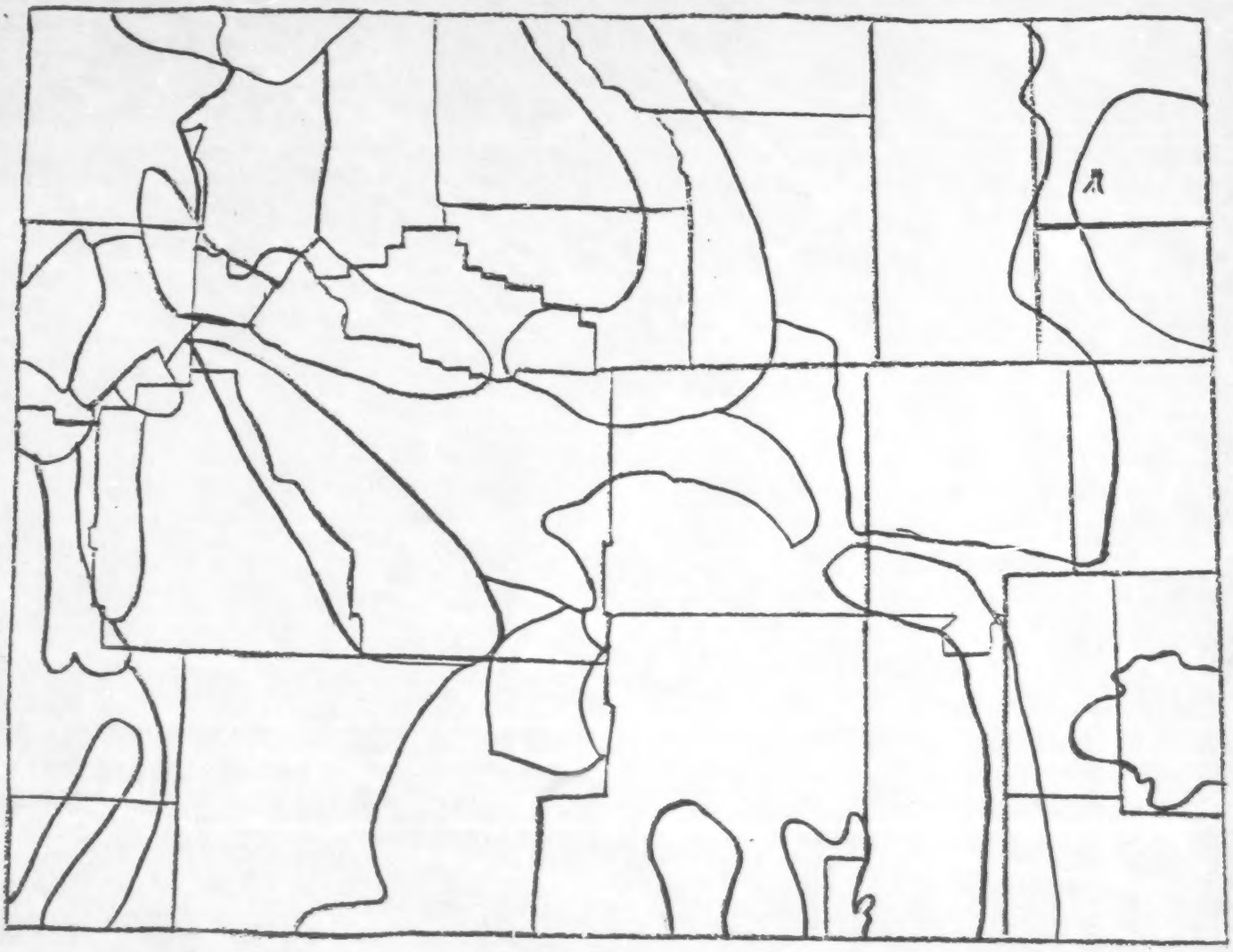






71 **WYOMING:** GEOLOGIC-TOPOGRAPHIC FEATURES 72

WYOMING: GEOLOGIC - TOPOGRAPHIC FEATURES AND COUNTIES



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WYOMING PROJECT MAP